

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau(43) International Publication Date
3 June 2004 (03.06.2004)

PCT

(10) International Publication Number
WO 2004/047085 A1(51) International Patent Classification⁷: **G11B 5/02**,
20/14, H03K 7/04, 7/06, 7/08, H04B 14/04[IN/US]; 12970 Fleetwood Drive North, Carmel, IN 46032
(US). **ZHANG, James, Zhiming** [US/US]; 10854 Belair
Drive, Carmel, IN 46080 (US).(21) International Application Number:
PCT/US2003/036575(74) Agents: **TRIPOLI, Joseph, S.** et al.; Thomson Licensing
Inc., 2 Independence Way Suite 2, Princeton, NJ 08540
(US).(22) International Filing Date:
14 November 2003 (14.11.2003)(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR,
CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD,
GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR,
KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN,
MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU,
SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,
UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(25) Filing Language: English

(26) Publication Language: English

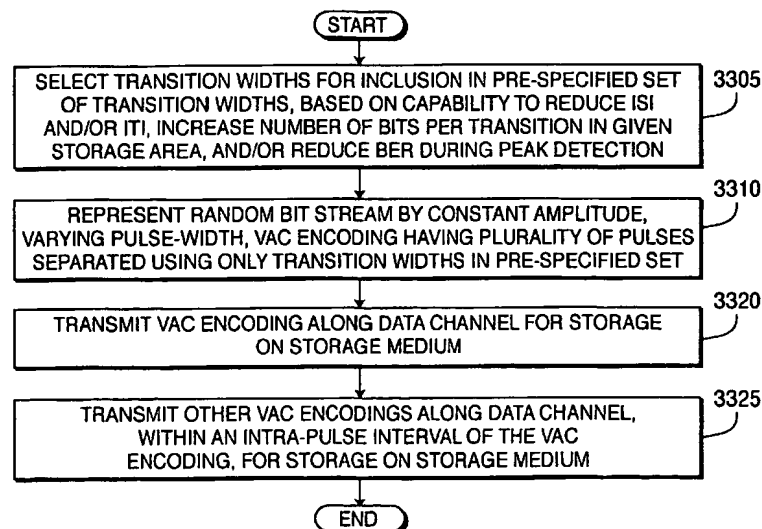
(30) Priority Data:
60/427,817 20 November 2002 (20.11.2002) US(84) Designated States (*regional*): ARIPO patent (BW, GH,
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE,
SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA,
GN, GQ, GW, ML, MR, NE, SN, TD, TG).(71) Applicant (*for all designated States except US*): **THOM-
SON LICENSING S.A.** [FR/FR]; 46, Quai A. Le Gallo,
F-92648 Boulogne (FR).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **MOHAN, Chandra**

[Continued on next page]

(54) Title: MULTI-DIMENSIONAL CODING FOR HIGH-DENSITY STORAGE MEDIA APPLICATIONS



(57) Abstract: There is provided a method for encoding a random bit stream in two-dimensions for storage on a storage medium. The random bit stream is encoded (3310) using Variable Aperture Coding (VAC) so as to generate a constant amplitude, varying pulse-width, VAC encoding that represents the random bit stream by a plurality of pulses separated using only transition widths included in a pre-specified set of transition widths.



Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/36575

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G11B 5/02, 20/14; H03K 7/04, 7/06, 7/08; H04B 14/04

US CL : 360/27, 40, 49, 51; 375/238, 239, 242

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 360/27, 40, 49, 51; 375/238, 239, 242; 332/108, 109, 112

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 46861 A1 (MOHAN et al.) 16 September 1999 (1999.09.16) Abstract, Figures 5, 6 and 7 Page 5, Line 1-Page 6, Line 26; Page 8, Lines 11-28 Page 10, Line 1-page 11, Line 18, Page 12, Line20-Page 13, Line 8	1-5, 7, 9-13, 15
X	US 6,359,525 B1 (MOHAN et al) 19 March 2002 (2002.03.19) Abstract, Figures 1 and 2 Column 3, Line 29-Column 4, Line 23	1-5, 7, 9-13, 15
A	US 6,055,119 A (LEE) 25 April 2000 (2000.04.25) Abstract, Figures 2, 4, 5 and 6 Column 4, Line42-Column 5, Line 15 Column 5, Line 56-Column 7, Line19	6, 8, 14, 16

☒ Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

16 March 2004 (16.03.2004)

Date of mailing of the international search report

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (703)305-3230

08 APR 2004
Authorized Officer

David R. Hudspeth

Telephone No. (703) 305-4900
Bucgenia Zogan

INTERNATIONAL SEARCH REPORT

PCT/US03/36575

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,490,091 A (KOGAN et al) 06 February 1996 (1996.02.06) Column 2, Lines 33-55; Column 5, Lines 4-45	6, 8, 14, 16